

Project Code and Title

B.02.01.03.03 Anatomic Thorax Model

Project Objective

Develop a finite element model of the human thorax with sufficient anatomic detail to investigate both bony and soft tissue injuries under automotive crash loads.

Background

Analytical modeling, in combination with experimental testing, will provide essential information on the mechanisms and tolerances of thoracic injuries.

Problem Definition

Understanding the complex problem of thoracic injuries is difficult using only experimental methods. A detailed finite element model will be used in combination with experimental testing to provide needed insight into the mechanisms and tolerances of thoracic injuries.

Research Approach

A detailed finite element model of the human thorax has been developed, including sufficient anatomic detail to investigate both bony and soft tissue injuries under automotive crash loads. This model will be used to study applications of interest to the automotive safety community.

Potential Impact/Application

All crashworthiness programs involving thoracic injury mechanisms and tolerances.

RESOURCE REQUIREMENTS	FY 95	FY 96	FY 97	FY 98	FY 99
Contract Money (\$K)	155.0	185.0	200.0	225.0	250.0

Project Manager(s)

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Project Tasks

<u>Task</u>	<u>Title and Description</u>
Task 1	Conduct crash simulations for both seat belt and airbag restraint systems. Compare injury related parameters for both types of restraints.
Task 2	Add full body representation to the thorax model to provide proper occupant kinematics.
Task 3	Run series of simulations to determine the effect of force limiting belts, alone and in combination with an airbag.
Task 4	Run series of simulations to study out-of-position occupants. Determine feasibility of using existing airbag model to conduct this study.
Task 5	Run side impact simulations and compare results with existing experimental data.
Task 6	Improve anatomic detail of model to include discrete organs.

Task	Start Date	Projected Completion Date	Status/Responsibility
1	10/93	5/94	Complete. Paper presented at 14 ESV conference.
2	6/94	9/95	Complete.
3	9/95	12/96	In progress. Modifications required to handle harsh loading of a 30 mph belt-only restraint.
4	12/96	12/97	
5	12/97	12/98	
6	12/98	12/99	